

IMPACT

Discoveries Making a Difference

THE HEALTH EFFECTS OF THE CLIMATE CRISIS

TWO STUDIES BY ROBBIE M. PARKS, PHD, ASSISTANT PROFESSOR OF ENVIRONMENTAL HEALTH SCIENCES, POINT TO HOW CLIMATE CHANGE MAY WORSEN HEALTH EFFECTS DUE TO HEAT EXPOSURE. Parks and fellow researchers found that temperature spikes due to climate change led to a marked increase in the number of hospital visits for alcohol-related disorders, including alcohol poisoning, alcohol-induced sleep disorders, and alcohol withdrawal in New York state. The higher the temperature, the more hospital visits. Higher temperatures also resulted in more hospital visits for disorders related to cannabis, cocaine, opioids, and sedatives, but only up to a

point—possibly because above a certain temperature people are less likely to go outside. The findings could inform policy on proactive assistance of alcohol- and substance-vulnerable communities during periods of elevated temperatures, which stand to become increasingly common due to climate change.

In a separate study, Parks and fellow researchers also determined that an estimated 1.8 million incarcerated people in the United States—primarily in Florida and Texas—are exposed to a dangerous combination of heat and humidity, on average experiencing 100 days of such conditions each year. In recent decades, the number of

dangerous humid heat days in carceral facilities has increased, with those in the South experiencing the most rapid warming. (The Starr County Jail in Rio Grande City, Texas, averaged 126 days of dangerous humid heat per year.) Exposure can lead to heat stroke and kidney disease from chronic dehydration, among other health issues. “Dangerous heat impacting incarcerated people has been largely ignored, in part due to perceptions that their physical suffering is justified,” says Parks. “Laws mandating safe temperature ranges could mitigate the problem.” Forty-four states do not require air conditioning for inmates. ●

BY THE NUMBERS

THE LATEST
ACHIEVEMENTS
AT COLUMBIA
MAILMAN SCHOOL
OF PUBLIC HEALTH

THREE

RANK AMONG PUBLIC HEALTH SCHOOLS
IN NIH PRIME AWARDS IN 2023, WITH
\$77 MILLION IN SUPPORT

55% →

GROWTH IN NIH GRANT
REVENUE SINCE 2020

IMPACT

AI SCORES A WIN

OpenAI's GPT-4 can accurately interpret types of cells important for the analysis of single-cell RNA sequencing with high consistency equivalent to the performance of human experts doing time-consuming manual annotation, Biostatistics researchers reported in *Nature Methods*.

The researchers assessed GPT-4's performance across 10 datasets covering five species and hundreds of tissue and cell types, including both normal and cancer samples. GPT-4 matched manual analyses in more than 75 percent of cell types in most studies and was notably faster.

"The process of manually annotating cell types for single cells can take weeks to months," says study author Wenpin Hou, PhD, assistant professor of Biostatistics. "GPT-4 can transition the process from manual to a semi- or even fully automated procedure and be cost-efficient and seamless." The researchers have developed GPTCelltype software to facilitate the automated annotation of cell types using GPT-4.

While GPT-4 surpasses current methods, there are limitations. "But fine-tuning GPT-4 could further improve performance," Hou says.



PUBLIC HOUSING OFFERS LEAD PROTECTION

AMERICANS LIVING IN PUBLIC HOUSING SUPPORTED BY THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD) have significantly lower blood lead levels than comparable populations, likely due to tighter enforcement of residential lead paint laws in HUD buildings, reports a new Columbia Mailman School study.

HUD provides affordable housing assistance to nearly 5 million families. The new study is the first to examine blood lead levels (BLLs) by federal housing assistance status. People with HUD assistance had 11.4 percent lower blood lead levels than a comparable waitlist group. They also had 40 percent lower odds of having a risky BLL. No protective effect was seen for housing choice vouchers. (HUD enforces more stringent lead controls in public housing units versus voucher-eligible units.) The link between housing assistance and BLLs was weaker for non-Hispanic Black and Mexican American participants than for non-Hispanic Whites, possibly due to exposure to other lead sources, such as contaminated drinking water and pollution.

"Lead exposure is a major health risk at any level," says senior author Ami Zota, ScD, associate professor of Environmental Health Sciences. Elevated BLLs in adults are linked with high blood pressure, cardiovascular disease, and kidney problems. Even low levels of exposure among children have been associated with neurocognitive impairment, poor school performance, behavioral problems, and criminality later in life. Approximately 3 million children currently live in public housing.

BY THE NUMBERS

24%

INCREASE IN NUMBER OF FULL-TIME FACULTY SINCE 2014

35%

PROPORTION OF FULL-TIME FACULTY WHO ARE PEOPLE OF COLOR, A HISTORIC HIGH

53%

PERCENTAGE OF TENURED FACULTY WHO ARE WOMEN

Photographs: iStock (2)



Reducing Cancer Risk Residing in a more walkable neighborhood protects against obesity-related cancers in women, report researchers in *Epidemiology*. They studied 14,274 women for more than 20 years and found that those in neighborhoods with higher walkability levels, as measured by average destination accessibility and population density, had a lower risk of postmenopausal breast cancer. Moderate protective associations were also found for endometrial cancer, ovarian cancer, and multiple myeloma.

USING YOUR BRAIN AT WORK PROTECTS AGAINST DEMENTIA

People with cognitively stimulating occupations between ages 30 and 70 had a lower risk of mild cognitive impairment (MCI) and dementia after age 70, finds a new study reported in *Neurology*. The study is the first to connect cognitively stimulating occupations and reduced risk for MCI and dementia with objective assessments rather than subjective evaluations.

The researchers looked at occupations such as teacher, salesperson, nurse and caregiver, office cleaner, civil engineer, and mechanic. The group with low occupational cognitive demands had a 37 percent higher risk of dementia compared to the group with high occupational cognitive demands. "Our study highlights the importance of mentally challenging job tasks to maintain cognitive functioning," says Vegard Skirbekk, PhD, former professor in the Heilbrunn Department of Population and Family Health and the Robert N. Butler Columbia Aging Center, who initiated the project. The next step will be to pinpoint the specific occupational cognitive demands that are most advantageous for healthy aging.

28%

PERCENTAGE OF FULL-TIME FACULTY WHO HOLD JOINT OR INTERDISCIPLINARY APPOINTMENTS WITHIN THE UNIVERSITY

EIGHT

NUMBER OF FEDERALLY FUNDED INTERDISCIPLINARY CENTERS AT THE SCHOOL

25

AVERAGE AGE OF STUDENTS AT ENROLLMENT



IMPACT

ENERGY INSECURITY TAKES A TOLL IN NYC

Researchers at Columbia Mailman School and the New York City Department of Health and Mental Hygiene have found that a stunning 30 percent of New York City residents experience energy insecurity, meaning they are unable to pay household energy bills, are in debt due to energy bills, have received a shutoff notice, or have shown other signs they are unable to meet their household energy needs due to cost. Residents with indicators of energy insecurity had higher odds of respiratory, mental health, and cardiovascular conditions and electric medical device dependence than residents with no indicators, the researchers reported in *Health Affairs*.

More than 1 in 4 New York City residents experienced indoor temperatures that were too cold (30 percent) or too hot (28 percent). Twenty-one percent had difficulty paying utility bills. Of those, a majority were in debt for energy costs. Three percent of residents experienced service shutoffs for heat, electricity, or gas. Black non-Latino and Latino residents, renters, recent immigrants, and households with children all experienced significantly higher levels of energy insecurity than their counterparts, notes study senior author Diana Hernández, PhD, associate professor of Sociomedical Sciences.



ADHD, AGING, AND CRASHES: A CONNECTION

OLDER ADULTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD) HAVE A HIGHER CAR CRASH RISK THAN OTHER OLDER ADULTS, finds a study that tracked more than 2,800 drivers aged 65 to 79 with in-vehicle devices for more than three years. The researchers linked ADHD to a 74 percent increased risk of crashes, a 102 percent increased risk in self-reported traffic tickets, and a 7 percent increase in the risk of hard braking events.

About 8 percent of adults are known to have ADHD. “ADHD could affect driving safety in different ways,” says Guohua Li, MD, DrPH, professor of Epidemiology. Inattention might result in a driver failing to notice a vehicle coming from the side, while impulsive tendencies could lead to speeding or cause a driver to cut in when it might be safer not to do so. Enhanced screening, diagnosis, and clinical management of ADHD in older adults might help counter driving issues, as could limiting use of in-vehicle media, such as the ability to make phone calls while driving.

Photograph: Nicholas Byrne, Unsplash

BY THE NUMBERS

66

NUMBER OF COUNTRIES REPRESENTED IN STUDENT BODY

96%

LIKELIHOOD A GRADUATE IS EMPLOYED OR CONTINUING THEIR EDUCATION WITHIN SIX MONTHS OF GRADUATION

24%

PROPORTION OF STUDENTS WHO ARE UNDERREPRESENTED MINORITIES

PLASTICS IN BOTTLED WATER Biostatistics researchers report that the average liter of bottled water contains 240,000 detectable plastic fragments—a far greater number than previous estimates. These nanoplastics are so tiny that they can invade cells and travel to the heart and brain.

POLICING THE POLICE RESPONSE

MAKING POLICE THE PRIMARY SOLUTION FOR INTIMATE PARTNER VIOLENCE (IPV) MAY HARM SURVIVORS, according to a new study that is the first to review the consequences of IPV policing in the U.S. IPV, which includes physical and sexual violence, psychological abuse, and other forms of coercion between current or former partners, impacts more than 40 percent of people in the U.S. The country has long maintained a police-centric response to IPV, despite growing calls for reform; there is mixed evidence that arrest reduces subsequent victimization and studies have documented an association between mandatory arrest laws and risk of survivor arrest.

The researchers analyzed scholarly articles about IPV published over 40 years. “More research is needed, but we know the current approach is ineffective and damaging,” says Seth Prins, PhD ’16, assistant professor of Epidemiology and Sociomedical Sciences. The study noted greater negative effects for Black survivors, as well as a lack of research into some consequences of IPV policing, such as police violence against survivors, reduced help-seeking, survivor arrest, or child protective services involvement.

CANNABIS CONUNDRUM

There is a growing unmet need for treatment for cannabis use disorder (CUD), yet treatment has actually *decreased* since 2004, particularly in states with medical cannabis dispensaries. “We found that specialty treatment for cannabis use disorder remained very low and decreased in states with dispensary provisions, even among people reporting past-year CUD, which is an indicator of treatment need,” says Pia Mauro, PhD, assistant professor of Epidemiology.

CUD has negative health and social consequences yet there are no pharmacological treatments approved by the Food and Drug Administration. While cannabis use in the U.S. remains illegal at the federal level, 38 states and the District of Columbia have medical cannabis laws, and 24 states and the district have recreational cannabis laws. “Few people needing CUD treatment in our study perceived a need for treatment,” Mauro observes. In other studies, cannabis laws have been associated with lower cannabis-related perceived harms. “We urgently need to target efforts in support of people with CUD, particularly in states with dispensaries. This includes training providers to increase screening and discussions about cannabis use,” says Mauro.

18%

PROPORTION OF STUDENTS WHO ARE FIRST-GENERATION COLLEGE GRADS

500+

NUMBER OF CAREER COUNSELING APPOINTMENTS WITH ALUMNI COMPLETED BY THE OFFICE OF CAREER SERVICES LAST YEAR

419

NUMBER OF CLASSES OFFERED DURING THE 2023–2024 ACADEMIC YEAR